

Illinois River Coordination Council
Science Advisory Board

Issue Paper on PBDE's

Polybrominated Biphenyl Ethers (PBDEs) are a group of chemicals similar in chemical structure to Polychlorinated Biphenyls (PCBs), which have been widely used over the past twenty years as a flame retardant. There are 209 possible PBDE congeners, but only three main types of products are produced, pentabromodiphenyl ether, octabromodiphenyl ether, and decabromodiphenyl ether. PBDEs are used in a wide range of plastic products including furniture, building materials, textiles, carpets, and in plastic materials in cars. About one fourth of the of the 600,000 metric tonne (1 metric tonne - 2204 lbs) production of flame retardants are PBDEs. Demand indicates 40% of the production is used in the United States, 30% in the Far East, and 25% in Europe.

Studies over the past four years have found that these compounds are globally distributed and even contaminate the deep oceans. Studies have determined that PBDE concentrations in North Americans are 10 to 20 times higher than Europeans with a doubling time of 4 to 5 years. PBDE's have also been found in salmon caught in Lake Michigan. Concentrations observed were the highest on the world for salmon. Evidence is developing that PBDE's bioconcentrate in the food chain. Toxicity studies indicate PBDEs can alter concentration of thyroid hormones, critical to growth and development, and that concentrations producing these effects are now close to concentrations being measured in North Americans.

Although PBDEs have been used for decades, the concern has been recent, and there is little definitive evidence of health or environmental effects. There has been a major effort in the U. S. Environmental Protection Agency to learn more about PBDEs and there are specific programs of research developing in the Great Lakes, funded, by the Great Lakes Program office of EPA. Even with the increase in the number of research studies, there is still much to be learned about these compounds and the environment.

Actions have already been taken by governments to address PBDE contamination. Following the Stockholm Convention on Persistent Organic Pollutants that was signed on May 22, 2001 many nations have agreed to eliminate persistent organic pollutants, or POPs. As of April of 2003, the treaty had been signed by 151 countries and ratified by 29 — it must be ratified by 50 countries before it goes into effect. The United States is among the countries that has signed, but not ratified, the Stockholm Convention. Two pending Senate bills call for ratification. The treaty calls for the international ban or phase-out of dioxins, PCBs and nine organochlorine pesticides, including aldrin, chlordane, DDT, dieldrin, endrin, hexachlorobenzene, heptachlor, mirex, and toxaphene. The treaty also establishes a process to identify and list additional POPs for eventual phase-out. PBDEs have not been listed for eventual phase-out at this time. The European Union has decided to ban two PBDE formulations starting next year and California banned two formulations beginning in 2008.